

## **Surgical Treatment of Gender Dysphoria in Adults and Adolescents: Recent Developments, Effectiveness, and Challenges**

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In 1990 Green and Fleming concluded that sex reassignment surgery (SRS) is an effective treatment for transsexuality because it reduced gender dysphoria drastically. Since 1990, many new outcome studies have been published, raising the question as to whether the conclusion of Green and Fleming still holds. After describing terminological and conceptual developments related to the treatment of gender identity disorder (GID), follow-up studies, including both adults and adolescents, of the outcomes of SRS are reviewed. Special attention is paid to the effects of SRS on gender dysphoria, sexuality, and regret. Despite methodological shortcomings of many of the studies, we conclude that SRS is an effective treatment for transsexualism and the only treatment that has been evaluated empirically with large clinical case series.

**Key words:** gender dysphoria, gender identity disorder, sex reassignment, sex reassignment surgery, transsexualism.

In the article, "Transsexual Surgery Follow-Up: Status in the 1990s," Green and Fleming (1990) concluded that "transsexual surgery" is an effective treatment for the alleviation of gender dysphoria in adults. This conclusion was based on the outcomes of 11 studies with a follow-up of at least 1 year. About 97% of a total number of 130 female-to-male transsexuals (FMs) considered their treatment outcome "satisfactory"; 3% were "unsatisfactory." Of the 220 male-to-female transsexuals (MFs), about 87% of the outcomes were considered "satisfactory," about 13% "unsatisfactory," and 1% "uncertain" (Green & Fleming, 1990). A similar conclusion was drawn by Pfäfflin and Junge (1992), who also

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included many smaller studies, as well as studies in languages other than English, in their review of about 70 studies published between 1961 and 1991. They reaffirmed the positive conclusions of earlier reviews (e.g., Abramowitz, 1986; Lundstrom, 1981; Lundstrom, Pauly, & Walinder, 1984; Pauly, 1981; see also Blanchard & Sheridan, 1990). Since then, new and better studies, sometimes conducted by researchers in countries that had never published results before, have been published. Two questions arise: Do these publications imply that adjustment of current treatment policies is necessary, and does this literature show other clinically relevant developments in the field of gender dysphoria. In this article, we review treatment evaluation studies in adults and adolescents conducted after 1990. For an overview of the nature of specific hormonal and surgical interventions in the treatment of gender identity disorders (GID), see Lawrence (2007b). Besides the treatment evaluation in terms of gender dysphoria alleviation, we will specifically address the sexual functioning of transsexuals, as this area is of increasing interest both to clinicians and applicants for sex reassignment (SR). Here we define *sex reassignment* as the totality of the psychological, hormonal, and surgical interventions that make it possible for a person to acquire the sex characteristics of the other sex to the fullest extent possible. In both the clinical and lay literature, views on gender dysphoria have changed considerably during the last 2 decades. As this topic also relates to treatment rationale, we include it in our discussion.

In this review we do not include the evaluation of treatment of prepubertal children with gender dysphoria because, in childhood, treatment is limited to psychological interventions, and there are no empirical studies that have systematically evaluated the effectiveness of these interventions (Zucker & Cohen-Kettenis, in press).

### **Terminology and Associated Conceptual Models**

Since the first edition of the *Diagnostic and Statistical Manual (DSM)* of the American Psychiatric Association was published in 1952, many terms have been used to identify individuals who were communicating their conviction that the sex characteristics of their body did not match their psychological gender. Although originally derived from Virginia Prince's term *transgenderist*, referring to a heterosexual man who cross-dresses as a lifestyle without a desire for complete SR, the term *transgender* has now become an umbrella term in the North American literature to refer to all people who are "gender-variant" (Lev, 2007b, p. 151; see also Cole, Denny, Eyler, & Samons, 2000), "who live full-time or part-time in the gender role of the opposite biologic sex" (Lawrence, 2007b, p. 473), or "whose gender expression is not in alignment with the

socially prescribed gender norms assigned to their biological sex" (Korrell & Lorah, 2007, p. 273). Transgendered people form a heterogeneous group. The group includes cross-dressers, MFs, FMs, androgynes, feminine gay men, butch lesbians, drag queens, heterosexual, as well as gender-bent queers, and two-spirit and intersex people (Lev, 2007b). Transgender is not only a descriptive term, but for many also ideologically loaded in that it signifies that more than two gender positions (male and female) are possible (e.g., Lev, 2007b; McKenna & Kessler, 2006; Cole et al., 2000). Some authors even argue that more than two sexes exist (e.g., Fausto-Sterling, 2000), which makes a conceptualization of gender variance based on a "natural order with two sexes" unsound (see also McKenna & Kessler, 2006). In consequence and in contrast to the traditional binary view, gender is regularly reconceptualized as a dimension on which many different positions are possible. Cole and colleagues (2000), for example, distinguished nine different positions on the gender continuum. Finally, some (e.g., Lev, 2007b) stated that the term *transgender* also includes a political dimension as "a self-descriptor of a radical, proud, activist transgender community that currently demands social justice and the right to self-definition and actualization" (Lev, 2007b, p. 152).

In contrast to the basic assumptions of this last view—gender variance as a normal phenomenon involving a right to self-definition and actualization—the *DSM* has consistently approached the diagnostic classification of gender dysphoria from the position that a divergence between the sex of the body and the gender of the psyche signals a psychiatric disorder. A psychiatric disorder is basically defined as a psychobiological dysfunction in the person causing suffering or disability, or increased risk of death, pain, disability, or an important loss of freedom. The specific terminology and place of the GID have varied in the different versions of the *DSM* (1952, 1968, 1980, 1987, 1994, 2000), but the core descriptive feature has remained since *DSM-III* (1980), when GID were first mentioned in the *DSM*: "an incongruence between anatomic sex and gender identity" (*DSM-III*, 1980, p. 261). The aversive experience of this incongruence is generally termed *gender dysphoria* (Cohen-Kettenis & Gooren, 1999). *DSM-IV-TR* (2000, p. 576) uses four main criteria to make a diagnosis of GID: (a) a strong and persistent cross-gender identification; (b) a persistent discomfort about one's assigned sex or a sense of inappropriateness in the gender role of that sex; (c) no concurrent physical disorder of sexual development; and (d) significant distress or impairment. The term *transsexuality*, which was introduced in *DSM-III* (1980), but has not been used since *DSM-IV* (1994), is often used, however, in the literature (see Cohen-Kettenis & Gooren, 1999).

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and is also still used by ICD-10 (World Health Organization [WHO], 1992). Transsexuality is defined as the extreme end of the spectrum of GID and characterized by a pursuit of sex reassignment (surgery) (Cohen-Kettenis, 1999; Kuiper & Cohen-Kettenis, 1988). Despite some small variations, the *DSM* has also consistently made a nosological distinction between GID in children, adolescents and adults, and a category labelled *gender identity disorder not otherwise specified*. This label, which was first used by the *DSM-III-R* (1987, p. 77), replaced the terminology *atypical gender identity disorder*, which was used by the *DSM-III* (1980, p. 266). In the *DSM-IV-TR* (2000), GID are categorized categorically and not dimensionally: That is, mental disorders are divided “into types based on criteria sets with defining features” (*DSM-IV-TR*, p. xxxi). In light of the ongoing debate about whether the *DSM* should be categorical or dimensional (e.g., Widiger & Trull, 2007), it remains to be seen how the *DSM-V*, foreseen for 2010, will conceptualize GID. If the *DSM-V* chooses a dimensional system, the important question will become at what point of intensity or strength will a GID become eligible for SR?

Another problem is that when authors use different terminologies, it is not always clear which terms refer to which patient groups, and which patients are or are not included in outcome studies. Furthermore, differences in terminology complicate the debate about which eligibility criteria should be used to determine which persons are allowed to undergo SR (e.g., Cohen-Kettenis & Gooren, 1999; Cole et al., 2000; Korrell & Lorah, 2007; Lawrence, 2007b; Lev, 2004, 2007b; McKenna & Kessler, 2006). Many proponents of the psycho- or bio-pathological model hold that only persons diagnosed as “true” transsexuals or persons with GID according to the categorical *DSM* are eligible for SR. In contrast, because proponents of the “normal” variant view are convinced that the aim of care is to assist people in developing a gender variant identity and in coping with stigmatization and discrimination, they propose that all transgendered people have in principle a right to some particular forms of surgery (e.g., Denny, 2004; Lev, 2007a). Although some adherents of the humanistic model claim that “the medical model of gender identity as a disorder has been damaging to transgender people’s self-esteem and has negatively impacted their social cohesion and their collective sense of identity” (e.g., Lev, 2007b, p. 155), only very limited research evidence has been put forward to validate this critique (see also the review of Korrell & Lorah, 2007). Nor has much research supported the view that the psychopathological model would force individuals to adapt their life stories to fit the existing diagnostic categories that this approach uses to grant SR to clients (e.g., Hausman, 1995;

Lev, 2007b; Walworth, 1997; see also Bockting, Knudson, & Goldberg, 2006; Speer & Green, 2007; Speer & Parsons, 2006). Whatever one's position in this controversy, at this moment the only empirically validated intervention to reduce gender dysphoria is SR.

### **Treatment Approaches to Gender Dysphoria**

Historically, one can distinguish two treatment approaches to gender dysphoria: psychological interventions to cure gender dysphoria and medical interventions to eliminate gender dysphoria by adapting the sex of the body to the gender of the mind. The medical interventions of hormone treatment and surgery are offered from both a psychopathological and a humanistic model.

#### *Psychotherapy as a Cure for Gender Dysphoria*

Until the mid-1970s, the dominant view held that gender dysphoria, and transsexualism in particular, was a psychiatric disorder that should be treated by psychotherapy only (e.g., Davenport & Harrison, 1977; Del-laert & Kunke 1969; Socarides 1969, 1988). Some clinicians still hold this view (e.g., à Campo, Nijman, Merckelbach, & Evers, 2003; McHugh, 2004; Volkan & Greer, 1996). However, up to 2007 no randomized controlled studies evaluated the efficacy or the effectiveness of psychotherapeutic interventions to cure gender dysphoria (see also Cohen-Kettenis & Gooren, 1999). Very few reports describe some form of psychological intervention to cure gender dysphoria in a systematic way: Barlow and colleagues (Barlow, Abel, & Blanchard, 1977, 1979; Barlow, Reynolds, Agras, & Miss, 1973) reported on four cases, and Marks and Mataix-Cols (1997) on one case. Barlow and colleagues treated three male patients with transsexualism (17, 25, and 26 years of age, respectively) with an intensive and multifaceted behavioral treatment program that targeted role behaviors, sexual arousal and sexual orientation, and social skills. Follow-ups at 6.5, 3, and 5.5 years revealed a stable remission of transsexualism. In their fourth case, a faith healer had used exorcism to cure a 21-year-old biological male. At a 2-year follow-up, this person's transsexualism was still in remission. Marks and Mataix-Cols (1997) reported on the "loss of transsexualism and homosexuality" in a man of 42 years treated with behavior therapy for his obsessive-compulsive disorder (OCD). However, 4 years later, the patient's transsexualism reappeared. Based on approximately nine cases reported in the literature and five cases from Green's clinical practice, Marks, Green, and Mataix-Cols (2000) concluded that gender dysphoria can remit sometimes with psychopharmacological (other than hormone) treatment or psychotherapy for at least 10 years.



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These reports suggest that an alleviation of gender dysphoria as a result of psychological interventions is not impossible. Indeed, gender dysphoria comes in various forms or intensities, and it is probable that, for some, change is possible. In order to know which types are suitable for which kind of psychological interventions, randomized control studies are necessary. For transsexuals who pursue nothing else but SR, however, such studies are not feasible, as few such people would participate in studies aimed at “curing” their transsexualism (Barlow et al., 1979; Michel, Mormont, & Legros, 2001). Even if a psychological “cure” did exist, an interesting ethical question remains: Does an individual with a gender identity disorder or gender variance still have the right to choose SRS without first undergoing the psychological intervention that would “cure” his gender variance?

Barlow and colleagues (1979) hoped that their successful treatment of their four cases would lead to the discovery of psychosocial determinants in the etiology of GID and thus lead to much more effective psychological interventions. However, that did not happen. On the contrary, although researchers have pointed to some genetic, hormonal, and brain factors contributing to the etiology of GID, psychosocial determinants have not been identified, and the etiology of GID remains largely an enigma (for reviews: Byne, 2007; Cohen-Kettenis & Gooren, 1999; Gooren, 2006a), and psychosocial treatments targeting the etiology or pathogenesis of gender dysphoria do not exist.

*Sex Reassignment as a Treatment for Gender Dysphoria: Treatment Rationale*

Since the opening of the first gender identity clinic in the United States at Johns Hopkins University in 1966, the dominant paradigm to treat the most extreme form of gender dysphoria, transsexualism, has been sex reassignment, often used as a synonym of sex reassignment surgery (SRS) and vice versa. Although the methodological quality of the outcome studies in this field was often poor (Day, 2002; Lawrence, 2003; South and West Development and Evaluation Service, 1998), SR(S) is the only treatment that has been evaluated empirically (for reviews see Blanchard & Sheridan, 1990; Cohen-Kettenis & Gooren, 1999; Green & Fleming, 1990; Lawrence, 2007b; Michel et al., 2001; Pfäfflin & Yunge, 1992; Schroder & Carroll, 1999). The paradigmatic basis of this approach was eloquently expressed by Money and Ambinder (1978).

By next century, research into the etiology of gender identity transposition may suggest new and better therapeutic approaches to transsexualism. Insofar as SR provides the opportunity for the medical profession to main-

tain contacts with transsexuals, it will facilitate such research. In the interim, SR is the only demonstrably effective treatment—rehabilitative treatment, not curative. Truly preventive and/or curative treatment still awaits discovery. (p. 844)

Today, most clinicians still agree that SR(S) is not a cure for a pathological condition but a strategy to diminish the serious suffering of a transsexual person. If such curative treatments (e.g., new forms of psychotherapy or psychopharmacological interventions) were available and shown to be effective, many clinicians would probably prefer those other options over SR(S).

Clinicians using both psychopathological and humanistic models offer the same medical interventions but with clearly different treatment rationales. The humanists consider medical treatment a method to assist people in finding self-actualization, not as a way to cure a psychopathological condition or alleviate the suffering that goes with it (e.g., Cole et al., 2000; Lev, 2004, 2007b; McKenna & Kessler, 2006). Despite their differences regarding the purpose of SR, both camps agree on several points: (a) careful consideration of the pros and cons of medical intervention, (b) a sensitive, thorough, and recorded decision process to prevent postsurgical regret (e.g., Lev, 2007b, p.154), and (c) evaluation of the effectiveness of SR. In other words, both parties reject a consumer-oriented approach.

#### Effects of SR in Adults

After the introduction of SR, various positive reviews appeared on the effects of this intervention (e.g., Abramowitz, 1986; Lundstrom, 1981; Lundstrom et al., 1984; Pauly, 1981). As already mentioned, Green and Fleming (1990) reviewed 11 studies with a follow-up period of at least 1 year involving 220 FM and 130 MF subjects; they concluded that sex reassignment is effective, a conclusion reaffirmed by Pfäfflin and Junge (1992) in their review of about 70 outcome studies published between 1961 and 1991. From 1990 through 2006, 18 new outcome studies of sex reassignment in adults (see Table 1) were published in peer reviewed journals. Using Green and Fleming's (1990) methodology, we located these studies by searching PubMed and PsycINFO with the terms *gender identity disorders*, *transsexualism*, *transsexuality*, and *transgenderism* for the period 1990 to 2007 and further searched these references for outcome studies with a follow-up period of at least 1 year after SRS. Because very few outcome studies were found in this way, we added studies that we could track through the "snowball method."

Because we believe that the core issue to be evaluated through outcome studies is the effect of the treatment on gender dysphoria, as the

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core symptom of a GID, and only secondarily the effect on other psychosocial variables, we specifically included in this review studies that used satisfaction with the results of SRS and regret as the main dependent variables (Kuiper & Cohen-Kettenis, 1998; Lawrence, 2003). Although they do not have an average follow-up period of at least 1 year, we included, for the sake of completeness, the studies of Tsoi, Kok, Yeo, and Ratnam (1995) and Krege, Bex, Lümmen, and Rübber (2001). Barrett's (1998) study "Psychological and Social Function Before and After Phalloplasty" was not included because it was not a follow-up study but, rather, a study comparing the data of two different groups: one group of 23 persons accepted for phalloplasty and the other of 40 transsexuals who had already undergone such surgery.

To compare the different studies we used the same method as Green and Fleming (1990) in dividing the outcomes into satisfactory, unsatisfactory, and uncertain. Even the use of this gross measure was not easy, because some investigators did not use a separate outcome measure to indicate overall reduction of gender dysphoria but instead used different outcomes to measure the effects for SRS. For example, Freundt, Toolenaar, Huikeshoven, Jeekel, and Drogendijk (1993) used as dependent measures, sexual adjustment, overall ability for self-support, overall social adjustment, and anatomic outcome. For each study reviewed, we mention how the effects of SRS on gender dysphoria and regret were estimated.

Finally, we note several exclusions. Besides evaluations of psychosocial or psychopathological variables, there is also a literature on the effects of SRS on plastic surgical parameters *sensu strictu* (e.g., Goddard et al., 2007; Hage & van Turnhout, 2006; Monstrey & De Cuypere, 2007; Selvaggi, et al., 2005; Selvaggi et al., 2007). Although we recognize this as an important outcome area, because the whole of the physical and functional results of surgery contribute to the (dis)satisfaction of persons with their SRS (e.g., Lawrence, 2003, 2006b), a technical review of this surgical field is beyond the scope of this review. The same holds for the evaluation of the medical effects of hormone use (e.g., Mueller, Kiesewetter, Binder, Beckmann, & Dittrich, 2007; Schlatterer et al., 1998).

*Overview of Follow-Up Studies*

The 18 studies we located reported follow-up data of at least 1 year from 807 persons who had undergone SRS: 193 FMs and 614 MFs. The studies of Krege et al. (2001) and Tsoi et al. (1995) with follow-ups of less than 1 year included 31 MFs and 17 FMs. In the following overview, we divided all follow-ups into two groups: FM studies and MF



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Table 1  
Uncontrolled Follow-Up Studies of Adult SRS

Study number, investigator(s), & publication year	Country	Nature of design	Number of persons that underwent SRS	Number of persons at follow-up	Attrition rate, number of dropouts	Mean age at SRS follow-up	Mean age at follow-up (in months)	Method of evaluation	Result: Satisfactory	Result: Unsatisfactory	Result: Uncertain
1. Stein et al. (1996)	United States	Only posttest	FMs: - MFs: 22	FMs: - MFs: 10	FMs: - MFs: 12 (55%)	FMs: - MFs: Not specified	21.56 (FMs) 24.56 (MFs) Based on Table 1 of original publication	Interview	FMs: - MFs: 10	FMs: - MFs: 0	FMs: - MFs: 0
2. Freund et al. (1993)	Netherlands	Only posttest	-	-	-	-	52	Structured interviews	-	-	-
3. Kralje & Blomert (1993)	Germany	Only posttest	65 (NSS)	20	35 (54%) (NSS)	33.7 (All follow-up)	43.2 (NSS)	Semi-structured interview	20	0	0
4. Tsou (1993)	Singapore	Pre- and post-interview	7	36	45	27.39 (All SRS)	No mean specified, range: 24 to 40	Interview and semi-structured interview	36	45	-
5. Smith et al. (1994)	Great Britain	Only posttest	-	12	11	-	33 (All follow-up)	Structured interview, and 2 psychological tests	-	10	-
6. Tsou et al. (1995)	Singapore	Pre- and post-interview	17	-	0	30.2 (All SRS)	7	Structured interview	11	-	0
7. Bodlund & Kullgren (1996)	Sweden	Pre- and posttest	9	10	0	31.7 (All follow-up)	60 (Both for FMs follow-up and MFs)	Personal interview & questionnaire	6	6	2
8. Jann, Wolff, & Weidner (1996)	Germany	Only posttest	-	52	37	-	90	Semi-structured interview	-	37	0
9. Rafie et al. (1996)	(former) Yugoslavia	Only posttest	36 (NSS)	10	6 (66%) (NSS)	27.80 (All SRS)	21.75 (NSS)	Self-report instrument	10	22	0
10. Elda et al. (1997)	Sweden	Only posttest	82	53	42 (51%)	34 (All SRS)	69.6 (NSS)	Questionnaire	64 (NSS)	10 (NSS, including regret in 2 FMs and 2 MFs)	16 (NSS)
11. Kauchich et al. (1998)	Switzerland	Only posttest	21	48	13 (81%)	Not specified	114 (FMs) 168 (MFs) based on Table 1 of original publication	Semi-structured interview	2	10	0

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Table 1  
Uncontrolled Follow-Up Studies of Adult SRS (continued)

12. Reimann et al. (1999)	United States	Only posttest	-	47	-	28	-	19 (40%)	-	30.6 (AI SRS; based on Table 1 of original publication)	No mean specified but up to 36	Mail questionnaire & personal interview or telephone interview	-	28	-	0	-	0
13. Krage et al. (2001)	Germany	Only posttest	-	66	-	31	-	35 (53%)	-	Median = 36.9 (AI SRS; Mean not specified)	At least 6	Questionnaire	-	31	-	0	-	0
14. Hagg et al. (2003)	Switzerland	Only posttest	12	18	10	15	2 (17%)	3 (17%)	Not specified (At the first consultation of the diagnostic procedure; the mean age for FMs & MFs was 30)	51 (NSS)	Semi-structured interview & 4 psychological tests	8	12	2	3	-	-	
15. Lawrence (2003)	United States	Only posttest	-	723	-	212	-	495 (68%)	-	44 (AI SRS)	Minimal	Questionnaire	-	216	-	15	-	1
16. Smith et al. (2003a)	Netherlands	Pre- and posttest	38	104	49	77	9 (6%)	27 (26%)	35.2 (AI follow-up)	21.3 (NSS)	Battery of psychological questionnaires	48	71	1 (Same regret)	6 (Same regret)	0	0	
17. De Chayere et al. (2003)	Belgium	Pre- and posttest	107 (NSS)	23	32	32 (69%) (NSS)	-	-	26.9 (AI SRS)	74.4 (AI SRS)	Biographical questionnaire (FMA); Image Scale, Body Image Scale, Satisfaction Scale	17 of the 19 patients with phalloplasty (See Table 5 in the original publication)	25 of the 29 patients with vaginoplasty (See Table 5 in the original publication)	0	1	2	3	
18. Lobato et al. (2006)	Brazil	Only posttest	1	29	1	18	0	11 (38%)	33.16 (AI SRS)	33.16 (AI SRS)	24.9 (NSS)	Self-designed questionnaire	1	18	0	0	0	0

Note. NSS = Not specified separately for FMs/MFs.

studies. In all the studies that included FMs and MFs, the same outcome measures were used for the separate groups. We describe these measures only in our review of the FM studies.

#### *FM Studies*

Kaube and Biemer (1993) studied 20 FMs who underwent SRS between 1979 and 1987. The criteria by which applicants were accepted for SRS were not specified. In 10 cases a phalloplasty was created, 6 had a clitoris mobilization, and 4 opted for a mastectomy, hysterectomy, and ovariectomy only. The dependent variables were satisfaction with results of surgery, suicidality, alcohol and drug use and abuse, partnerships, and sexuality, measured by a semistructured interview after the SRS. Of the 20 patients, 17 (85%) were (very) satisfied with the surgical results. Suicidality was significantly reduced postoperatively: 10% of the patients attempted suicide postoperatively, whereas preoperatively 40% reported suicidal ideation. Not one patient reported alcohol or drug abuse after the SRS. Eighteen (90%) of the patients found a steady relationship important and 15 (75%) had a female partner at the time of the follow-up interview. Eighty percent of the patients were satisfied with their sexuality, and no patients regretted the SRS. Not surprisingly, Kaube and Biemer concluded that SRS was, despite its limitations, the only effective treatment for transsexuality.

In one of the few follow-up studies from Asia, Tsoi (1993) evaluated 36 FMs who had undergone SRS between 1972 and 1988. Diagnostic and inclusion criteria were not formally specified. The dependent variables, measured by pre- and postsurgical interview, were adjustment, relationship with partner, appropriate clothes, satisfaction with sexual function, satisfaction with surgery, and satisfaction with the new status. Overall, the outcome was very good. Of the FMs, 95% were satisfied with the new status; 81% were satisfied with their partner relationship; 61% were sexually content, although 39% were not satisfied with the new penis. Tsoi (1993) evaluated this result as understandable because it was not possible to make a fully functioning neophallus. Social adjustment was rated as good to very good by 81%. Like Kaube and Biemer (1993), Tsoi reached the conclusion that "sex-reassignment surgery improves the social and emotional functions of carefully selected transsexuals" (Tsoi, 1993, p. 517). However, it is not clear what "carefully selected" means operationally in clinical practice. Because no patients reported postsurgical regret, we scored all the patients in the category as having satisfactory outcome.

In a second study, Tsoi and colleagues (1995) reported the results of an investigation of 17 FM transsexuals who had received SRS after

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1989 in Singapore. Diagnostic criteria were not specified. Three dependent variables—marriage and acceptance, sexual functioning, and satisfaction with surgery—were evaluated by means of a structured interview, which was carried out with most patients 2 to 5 years after the SRS. Eleven patients were single and six were married (two more than before SRS). Sexual satisfaction declined after the operation: Before surgery 82% were satisfied, but only 59% remained so after surgery, and approximately 45% were able to achieve some form of penetration using condoms to stiffen their penis. One third of the patients were dissatisfied with the results of surgery, an effect attributed to surgical complications and the functional limitations of the new penis; 41% were not willing to undergo the SRS again. In contrast with his earlier study, Tsoi estimated the results of SRS as less favorable but still concluded that “the majority of the Singapore cases were satisfied with their operation and had a favorable outcome, like those abroad” (p. 667). Although Tsoi et al. (1995) interviewed patients both before and after surgery, they did not specify precisely which questions were asked. Based on the answers to the question on the degree of satisfaction with surgery (see Tsoi et al., 1995, Table III, p. 666), we rated 11 cases as satisfactory and six as unsatisfactory. Had we used the answer to the questions on satisfaction with sex organ and satisfaction with life after the operation, our rating of the results would have been nearly the same (see Tsoi et al., 1995, Table III, p. 666).

In a much more systematic Swedish pre-and postsurgery study with validated instruments (SCID-screen, Structural Analysis of Social Behavior & Defense Mechanism Test) and a clinical interview, Bodlund and Kullgren (1996) included nine FMs in their follow-up. All were diagnosed as having GID following the *DSM-III-R* classification (1987). All operations were performed in 1989 or 1990. The dependent variables were socioeconomic status, participation in work or studies, interpersonal relationships, use of psychiatric care, the *DSM* global assessment functioning scale, and the patients’ own evaluations and global improvement. Overall, SRS was an effective treatment for most of the patients. In one case, the outcome of the SRS was unsatisfactory, and two others reported either no improvement or a worsening of their social, psychological, and/or psychiatric functioning. So, we counted three cases as unsatisfactory.

In the first outcome study of SRS in former Yugoslavia (Rakic, Starcevic, Maric, & Kelin, 1996), 10 FMs diagnosed following the guidelines of the *DSM-III-R* (1987) and the *Standards of Care of the Harry Benjamin International Gender Dysphoria Association* (HBIGDA; now the World Organization for Transgender Health), underwent SRS

between 1989 and 1993. (Note that the first edition of the *Standards of Care* was published in 1979; the sixth edition in 2001 [Meyer et al. 2001].) However, only so-called “homosexual” transsexuals were allowed to undergo SRS because the Belgrade Team for Gender Identity Disorders estimated that the acceptance of “heterosexual” transsexuals for SRS would not be tolerated by the Yugoslavian society. By use of a self-report instrument, four main dependent variables were measured: attitude towards one’s own body, relationships with other people, sexual activity, and occupational functioning. The authors reasoned that the first three of these variables represented the core features of transsexualism—in *casu* aversion to one’s own body, refusal of the sex role attributed by society to one’s own biological sex, and as a result interpersonal and sexual difficulties. Occupational functioning was used as a measure of quality of life. Not one of the FMs regretted the SRS. On the contrary, nine (90%) were satisfied and one (10%) was satisfied to some extent. We rated this last result as “uncertain” and the nine others as “satisfactory.” On most variables, there were significant improvements after SRS. For example, the percentage that had a job or went to college rose from 60% before the SRS to 100% after the SRS. However, these improvements do not imply that there were no remaining problems. For example, 75% of the FMs did not reach orgasm after SRS.

In another study, Eldh, Berg, and Gustafsson (1997) included 50 FMs in their follow-up study SRS in Sweden. All patients received SRS between 1965 and 1995. They were diagnosed following the *Standards of Care* of HBGDA, and their indication for SRS was made by a group of experts at the National Board of Health and Welfare. The follow-up evaluation was done by means of a post-SRS mail questionnaire. Seventy percent of the FMs were satisfied with the results of surgery, and 74% FMs had a clear and stable sexual identity; however nine patients were unsure of their sexual orientation. Thirty-four percent reported satisfaction, and 38% reported dissatisfaction with their sex life; unfortunately, Eldh and colleagues failed to specify the nature of these clients’ sex lives. Most patients (37) had the support of their friends and families; 46% lived in a stable relationship, but 54% were without such a relationship and were mostly socially isolated. Two FMs regretted their SRS. The overall satisfaction with life was quite good after SRS: 64 of 74 patients (86.4%) who responded to this question were content with their overall life-situation. Unfortunately, the authors did not differentiate between the FMs and the MFs. So we rated 64 cases as satisfactory, 10 as unsatisfactory, and 16 as uncertain.

From Switzerland, Raufleish, Barth, and Battegay (1998) used a mail questionnaire to follow-up on four FMs, operated between 1970 and



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1990. Two of the four had a satisfying relationship and were satisfied with their sex life; the other two were living alone. Two were satisfied with the results of their SRS, and two were not. The first two reported no psycho(patho)logical problems, but the others complained of depression, substance abuse, and affective lability. We rated these two results as unsatisfactory.

Also from Switzerland, Hepp, Klaghofer, Burkhard-Kübler, and Buddeberg, (2002) reported better results than Raufleish et al. (1998) in a retrospective follow-up, which included 10 FMs at follow-up after SRS. All were diagnosed following ICD-10 (WHO, 1992); all 10 persons had a diagnosis of transsexuality. The outcome of SRS was assessed by means of a semistructured interview (face-to-face for the majority of patients and by telephone for a minority) and four psychological tests measuring anxiety and depression, life satisfaction, body image, and social integration. The mean follow-up after surgery was 51 months. All the patients started the diagnostic procedure at the treatment center between 1990 and 1995. Overall, the results were very good. On the psychological variables, the patients functioned as well as the psychometric group of "normal people" and, in general, they were socially well integrated. Most of the patients kept their jobs and their personal relationships ameliorated after the SRS. Eighty percent of the patients (unfortunately not differentiated between FMs and MFs) were satisfied with the functional results of SRS and 75% were satisfied with the aesthetical results. The authors did not report how many patients regretted the SRS. Consequently, it was very difficult to rate the results of this study using our categories—satisfactory, unsatisfactory, and uncertain. Nevertheless, we opted for a rigorous rating and, extrapolating the results of the whole patient group (FMs + MFs) to the FMs, we counted eight cases as satisfactory and two as unsatisfactory.

The prospective Dutch pre-posttest study of Smith, van Goozen, Kuiper, and Cohen-Kettenis (2005a) included 64 FMs at follow-up. All patients were diagnosed following *DSM* criteria by an experienced gender team and were tested with an elaborate battery of psychological tests. No dates of surgery were specified. The main dependent variables were gender dysphoria, body dissatisfaction, physical appearance, psychological functioning, social support, and postoperative functioning. The most important result was the near disappearance of gender dysphoria at follow-up, especially in the FMs. The results on the other outcome measures reflected clear positive effects of SRS as well: Body dissatisfaction diminished very strongly; psychological functioning, on average already rather high at application, ameliorated at follow-up; and 89.1% of the FMs felt accepted by most people. Only one FM reported some regret during treat-

ment but expressed no desire or intention to resume the original gender role. Nevertheless, we rated this result as the only unsatisfactory result of this large series of FM patients.

The Belgium study by De Cuypere et al. (2005) included 23 FMs at follow-up. All patients had undergone SRS between 1986 and 2001. With sound instruments, the general health of the patients, their body image, and their satisfaction with the SRS were measured. A specific part of an extensive, structured follow-up interview (250 items) measured the effects of SRS on sexuality (the effects on this measure are reviewed in more detail in the coming section on sexuality). In overall effect, not one of the FMs was dissatisfied with the results of surgery (see Table V, p. 686 in De Cuypere et al., 2005). Approximately 11% were neutral about the effects of phalloplasty. All the others were satisfied or very satisfied. In our rating scheme, we translated the neutral category into our category "uncertain."

The most recent study reviewed is the Brazilian follow-up study by Lobato et al. (2006) of patients diagnosed with GID following *DSM-IV-TR* (2000). Only one FM participated in this study. She did not regret the SRS, and accordingly this case was rated as satisfactory. Information about the used measures is given in the section on MF studies.

#### *MF Studies*

The first study after Green and Fleming's (1990) review is Stein, Tiefer, and Melman's (1990) follow-up of 10 MFs who had undergone SRS between 1985 and 1988. The duration of the follow-up was 21.4 months. Stein and colleagues (1990) assessed by an interview three major dependent variables: sexuality, social functioning, and economic status. Sixty percent of the patients reported orgasm (at least occasionally) and 20% experienced frequent orgasm with intercourse. Seventy percent of the patients had close and supportive friends, and 90% received social support from their family. There were no suicide attempts after surgery, in contrast to three preoperatively. Economically, SRS had no effects: Most patients of this well-educated group kept their jobs. Not one patient regretted the results of surgery. Accordingly, we rated all cases as satisfactory in Table 1.

In the only follow-up study that compared transsexuals with another patient group that had undergone vaginoplasty (between 1983 and 1988), 10 MFs were included at follow-up after on average 52 months after surgery (Freundt et al., 1993). The other patients were 14 women with Mayer-Rokitansky-Küster syndrome, 1 patient with testicular feminization, 1 with androgen insensitivity, and 1 with an anterior exenteration as a consequence of sarcoma botryoides. The authors of this Dutch

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study did not describe how the transsexual patients were diagnosed. In the structured interview follow-up, three dependent variables were used to evaluate the effects of the creation of a sigmoid neovagina: sexuality, self-support, and social adjustment. Two MFs were not able to support themselves, three rated their social adjustment as unsatisfactory or doubtful, and four were sexually dissatisfied. Not one of the patients reported the creation of the neovagina as a failure. Because the effects of treatment on gender dysphoria, as such, were not measured in this study (nor was [the absence of] regret), it was difficult to translate the results of this study into our rating system. Based on the fact that not one of the transsexual patients evaluated the neovagina as a failure and that nobody doubted the individual's female identity, all results were rated as satisfactory.

In the already mentioned study of Kaube and Biemer (1993), 10 MFs were followed for an average of 43.2 months after the SRS. All received surgeries between 1979 and 1987. Seventy percent of the MFs were satisfied with the results of the SRS, and 90% thought their quality of life had ameliorated. No suicidality ideation or suicide attempts in this patient group had occurred since the SRS. The SRS had no effect on alcohol and drug use. Half of the MFs had a steady partner, and 7 of the 10 patients had had sex. In most cases the quality of their sexual life was improved, and not one patient regretted the SRS. Accordingly, we rated all patient outcomes as satisfactory.

Tsoi (1993) reported a follow-up of 45 MFs in Singapore based upon a pre- and postsurgery interview. Neither diagnostic nor inclusion criteria were specified. The results of the SRS were very favorable: No patients expressed regrets, and all showed good adjustment. Accordingly, we scored all results in the category satisfactory. Two thirds had a stable relationship, 91% were satisfied with the functioning of their neovagina, 64% were satisfied with sexual activity, 91% were satisfied with the results of surgery, and finally 100% were satisfied with the new sex status.

Eleven MFs were included in the only British follow-up study since 1990 (Snaith, Butler, Donnelly, & Bromham, 1994). All patients had proceeded through all stages of the gender reassignment, including vaginoplasty. The patients were diagnosed following the guidelines of the *Standards of Care* of the HBGDA. By means of an interview and two psychometric instruments, the General Health Questionnaire (GHQ) and the Hospital Anxiety and Depression Scale, four main dependent variables were evaluated: social relationships, self-confidence, enjoyment of leisure activities, and psychopathology. The results were very good. Only one patient reported no change at all, two reported some improvement on the main variables, and eight said that

their lives had ameliorated markedly (see Table 1, p. 755, in Snaith et al., 1994). On the psychopathological scales, no patient rated herself as depressed or anxious, and the scores on the GHQ signaled normal functioning for all. We translated these results into 10 satisfactory cases and one uncertain.

Bodlund and Kullgren's Swedish study (1996) included 10 MFs at follow-up. The average duration of the follow-up (from the first contact at baseline until the posttest) was 60 months. All were diagnosed following *DSM-III* (1980), and the indication for the SRS was approved by the National Board of Health and Welfare. The dependent variables were psychosocial functioning, participation in work or studies, and psychiatric functioning. Six patients made substantial progress in their functioning and were satisfied. Two reported that their situation and functioning had not changed. Finally, two judged their SRS as a failure. Accordingly, we classified six results as satisfactory, two as uncertain, and two as unsatisfactory.

The German study of Jarrar, Wolff, and Weidner (1996) included 37 MFs at follow-up (of an average 7.5 years). The patients had undergone SRS between 1972 and 1993. Measured by an interview, the dependent variables were satisfaction, somatic status, sexuality, and social and psychological status. All patients were satisfied with the results of the SRS, and not one regretted it. We scored these results in the same way. The results on the other outcome variables were also very good: 91% of the patients were satisfied with their sex life, 84% were happy with their social participation, and 91% rated their psychological functioning as in order. Interestingly, the authors used not only the self-reports of the patients but asked therapists also to rate the well-being of the MFs. Although the therapists judged the results of the SRS less favorably, the results were quite similar on the key variable "satisfaction." Jararr et al. used a strict inclusion procedure: Of the 169 persons who applied for SRS, only 52 underwent genital reconstructive surgery. It is not possible to compare this procedure with most other studies because this kind of information is seldom provided.

The follow-up sample of the Yugoslavian study of Rakic and coworkers (1996) consisted of 22 MFs with surgeries between 1989 and 1993. The mean duration of the follow-up period was 21.8 months for the whole patient group, both MFs and FMs. The inclusion criteria for genital surgery were (a) an unequivocal diagnosis of transsexualism, (b) a successful real-life test, and (c) sexual attraction to individuals of the same anatomical sex (homosexual transsexualism). The dependent variables, measured by a self-report questionnaire pre- and postsurgery, were gender dysphoria and quality of life. Gender dysphoria was mea-

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sured by attitudes toward the body, relationships with other people, and sexual activity. Quality of life was measured through occupational status. All MFs were satisfied with the sex change. So, we counted all the cases as satisfactory in Table 1. However, satisfaction with the sex change did not mean that 100% were also satisfied with the appearance of the body/genitals after surgery. On the contrary, 50% were satisfied with the way their body looked, 32% were satisfied to some extent, and 18% were not satisfied. Sexuality, interpersonal relationships, and quality of life improved significantly after SRS.

The Swedish questionnaire study of Eldh and colleagues (1997) included 40 MFs at the time of follow-up after surgeries between 1965 and 1995. More than three quarters (77.5%) had a stable identity. More than half (55%) were quite satisfied with their sex life, but a substantial number, 37.5%, were dissatisfied. Most patients (70%) had the support of their family and friends, and 58% were married or lived in a steady relationship. Two MFs regretted their SRS and returned to the male sex role.

Like the Eldh et al. study (1997), the Swiss study of Raufleish and coworkers (1998) was a questionnaire posttest-only study that had a follow-up sample of 13 MFs. With the exception of three patients (23%), this group was satisfied with the results of the SRS. However, their general psychological functioning was not good: 77% suffered from anxiety and affective disorders. Two of the three patients who regretted the SRS had undergone SRS again. The authors reported a condition not specified in many studies, that one of these patients had schizophrenia, and the other had an identity problem. We scored all three of these patients as unsatisfactory. The quality of life of many of these patients was problematic: Eight (61.5%) of them were very dissatisfied with their sex life and experienced very little sexual pleasure; only three (23%) of the FMs were orgasmic; two others (15%) were satisfied with their sexuality. Three (23%) of the patients reported a strong sexual desire, one sometimes a strong desire, and the nine others (69%) a weak sexual desire. Two (15.4%) had stopped sexual activities because of the painful complications and bad results of the SRS. Eleven (85%) patients were living alone, one (7%) lived with her mother, and one (7%) with a steady partner. Employment dropped significantly after the SRS: Instead of 12 (92%) employed, only 3 (23%) persons were employed after the SRS. Not surprisingly, and comparing their findings with other studies, Raufleish and colleagues (1998) concluded that their results were much worse than those of other researchers, especially with regard to employment. The authors do not speculate on the reasons for this discrepancy. One possibility is that the extent to which transsexual people are discriminated against and stigmatized socially differs among countries. How-



ever, social vulnerability and high unemployment have also been found in other studies (e.g., Eldh et al., 1997).

Rehman, Lazar, Benet, Schaefer, and Melman (1999) reported very favorable outcome results for a group of 28 MFs, operated on by one surgeon between 1980 and 1997. The surgical techniques included removing the male organs, creation of a neovagina and a sensate clitoris, and, in a later stage, labioplasty. All patients were indicated for SRS by specialized psychotherapists who had seen the patients for 1-2 years or for at least 15 sessions of psychotherapy. The follow-up results were based on a postsurgery questionnaire. In addition, the data collection was expanded with personal interviews with 11 patients and telephone interviews with the other 17 patients. All patients were more satisfied after surgery than before, and none regretted the SRS. So we rated all cases as satisfactory in Table 1. However, 25% reported some gender-related problems in their lives not solved by the SRS, mostly related to the skills required to live as a female in Western society. Regarding the general quality of life, 96% of the patients were satisfied, 55% had coitus postoperatively, and most reached orgasm. Not surprisingly, Rehman and coworkers concluded that SRS is an effective treatment for transsexualism but added that patients should realize that adequate coping skills to confront economic, emotional, and relational stressors are required for a successful life. As a consequence, Rehman and colleagues stressed the potential benefits of psychotherapy after SRS.

Krege and colleagues (2001) used a postsurgery questionnaire to evaluate the effects of SRS in 31 transsexual MF patients in Germany with a follow-up period of at least 6 months. All patients were referred by psychiatrists and had surgery between 1995 and 1999. The overwhelming majority (94%) of the patients were satisfied with the cosmetic results; 76% were satisfied with the depth of their vagina, 87% reached a clitoral orgasm, and 58% had coitus. None had regrets. We counted all results as satisfactory.

In Hepp et al.'s (2002) Swiss study, 15 MFs were included at follow-up, on average 51 months after SRS. All patients had a diagnosis of transsexuality according to the ICD-10 (WHO, 1992). As already mentioned, the effects of the SRS were evaluated by a post-SRS interview and four psychological tests, which measured anxiety and depression, life satisfaction, body image, and social integration. The results were basically the same as for the FMs: the MFs functioned well and (extrapolating from the results for the whole group of FMs + MFS (cf. Hepp et al., 2002, p. 287), we rated 12 cases as satisfactory and 3 as unsatisfactory. In comparing the MFs with the FMs, Hepp and coworkers concluded that the FMs functioned better than the MFs.

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In Lawrence's (2003) follow-up study, 232 MFs (the largest so far) participated. All underwent surgery between 1994 and 2000. Patients were diagnosed according to the *Standards of Care* guidelines, although 51 (22%) had not fulfilled all eligibility criteria of the *Standards of Care* before undergoing surgery. Lawrence used only a posttest questionnaire mailed to the patients. The outcome results were very positive: The mean score on the variable "happiness with SRS results" was 8.7 on a scale of 10, and no less than 86% of the MFs scored 8 or higher on their reported happiness. Only 4% scored 5 or less for the same variable. With the exception of one patient whose quality of life worsened and seven patients whose quality of life remained the same, all the others (225 or 97%) believed their quality of life had improved very much after the SRS. Not one patient completely regretted the SRS, although 15 (6%) patients experienced occasional regret. Two patients lived partly as men, but most of the time as women, and only one of these two occasionally regretted the SRS. We scored these 15 patients as unsatisfactory and the one who lived sometimes in the female role without regret as unsatisfactory. Very few variables correlated with the outcome of SRS. Only "childhood femininity in own opinion" (0.27), "the number of surgical complications" (-.37) and "a functional index" after SRS (0.49) were moderately correlated with the result of the SRS. Interestingly, psychotherapy before or after surgery did not contribute to positive outcome. On the contrary, the variables "more than 12 hours preoperative psychotherapy" (-.18) and "the amount of postoperative psychotherapy" (-.21) were correlated negatively with a positive outcome. Furthermore, participants with less than 12 months of preoperative real-life experience of living in the desired gender role did as well as persons who complied with a real-life experience of at least 12 months, as requested by the *Standards of Care* of the HBGDA. Based on these results, Lawrence (2003) questioned the usefulness of such a real-life period of 12 months and the usefulness of psychotherapy. She made the further point that being attracted to males or females and the frequency of autogynephilic arousal did not predict the results with SRS. She hypothesized that this result was a consequence of the growing social tolerance for transsexual persons in Western Europe and North America, a pattern that contrasts with the inclusion policy of Rakic et al. (1996) in Yugoslavia.

In a Dutch study, Smith et al. (2005a) used an extensive battery of psychological tests to evaluate SRS in 77 MFs at a follow-up of, on average, 21.3 months. All patients were diagnosed according to the *DSM* standards and the *Standards of Care* of the HBGDA. Gender dysphoria nearly disappeared after SRS: Approximately 90% of the patients

reported satisfaction with their body appearance, 70.1% were satisfied with the results of genital surgery, and 65.4% were satisfied with the results of breast augmentation. Psychological functioning improved significantly. Also, 42.1% of the sexually active patients reached orgasm. One person regretted the SRS and would not choose it again. One other patient indicated some regret but would choose SRS again. Four other MFs had some regret during the treatment but preferred to live in the "new" role. In total, we counted these six cases as unsatisfactory.

De Cuypere and coworkers (2005) from Belgium focused their prospective follow-up primarily on sexuality (see also below), but also considered general health and satisfaction with surgical results. At follow-up 32 MFs participated. Patients were diagnosed following *DSM* and the *Standards of Care* of HBGDA. All patients received surgery between 1986 and 2001, and the mean duration of the follow-up period was 45.6 months. Nearly all (95.2%) of the patients were satisfied with the results of breast augmentation, and 86.2% were satisfied with the results of the vaginoplasty. No patients were dissatisfied with the results of breast augmentation, but 3.4% were dissatisfied with the vaginoplasty. We counted the 3.4% as unsatisfactory. The patients that were neutral regarding the surgical results (4.8% for breast augmentation and 10.3% for vaginoplasty) were counted as uncertain. Nearly 50% of the MF patients in this study were sexually satisfied. Three quarters (75.8%) reported a significant improvement in their sexual functioning after the SRS, and two thirds achieved orgasm (almost) always. Nearly 60% of these patients had a steady relationship after the SRS.

Lobato and colleagues (2006) reported the first follow-up study from Brazil. The mean duration of the follow-up was 24.9 months. Diagnostic criteria followed *DSM-IV-TR* (2000). Only patients with a GID, no intersex condition, no psychotic or substance abuse disorder, and an age of more than 16 were accepted for an SRS. Their sample included a follow-up of 18 MFs. All were homosexual transsexuals: MFs sexually attracted to biological males. Furthermore, all were "early onset," that is, their gender dysphoria started in childhood. The first episode of childhood-role switching took place on average at the age of 5.2 years. The effects of SRS were evaluated by an interview and a questionnaire. The dependent variables were satisfaction with sexual experience, partnerships, and relation with family members. Sixteen (83.3%) of the patients reported that their sex lives improved after the SRS. Sixteen also rated their sex life as pleasurable and two had a (very) poor sex life. Approximately two thirds reported that starting and keeping a partner relationship had become easier after SRS. In seven of the cases, family relations improved

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after the SRS, and no patients experienced a worsening of the relations with his family. No patient regretted the SRS. In consequence, we rated all results as satisfactory.

*The Effectiveness of SRS in Adults: A Commentary*

What conclusions can be drawn from our review of the literature? First and foremost, and just as Green and Fleming (1990) concluded, SRS is an effective treatment for gender identity disorder in adults: 771 of 807 (96%) patients in the follow-up studies of at least 1 year were satisfied with the outcome of SRS.

Methodologically, however, this conclusion should be carefully qualified. Not one of the reviewed outcome studies was a controlled one. Unfortunately, the study of Mate-Kole, Freschi, and Robin (1990), in which they compared a waiting-list condition with a treatment condition, and of which Green and Fleming (1990) remarked that it provided strong evidence for the effectiveness of SRS, remains the only controlled study on the effects of SRS. Furthermore, a number of investigators used only a posttest to measure the effects of SRS. In many studies, sound psychometric instruments were not used. Especially disturbing is that many researchers did not directly measure gender dysphoria as the main outcome variable but instead used derivative measures, for example, satisfaction with surgery, sexual and interpersonal relationships, occupational and global functioning, or quality of life in general. Although these outcome variables are important, in our view, gender dysphoria should be the main, although not the sole, outcome variable following SRS.

In addition to the design problems of the studies, patient numbers are seriously skewed. A large number of patients who received surgery were lost at follow-up (see Table 1): For the FMs the attrition rate varies between 0% and 81%, with an average of 24% (based on Boldund & Kullgren, 1996; Eldh et al., 1997; Hepp et al., 2002; Lobato et al., 2006; Raufleish et al., 1998; Smith et al., 2005a, Tsoi et al., 1995). For the MFs, between 0% and 73% did not participate in the follow-up, with an average attrition rate of 39% (based on Bodlund & Kullgren, 1996; Eldh et al., 1997; Freundt et al., 1993; Hepp et al., 2002; Jarrar et al., 1996; Krege et al., 2001; Lawrence 2003; Lobato et al., 2006; Raufleish et al., 1998; Rehm et al., 1999; Smith et al., 2005a; Snaith et al., 1994; Stein et al., 1990). The studies of Kaube and Biemer (1993), Rakic et al. (1996), and De Cuypere and coworkers (2005) mentioned only the number of patients that underwent surgery without differentiating between FMs and MFs. In these three studies, the attrition rate was combined for FMs and MFs: 54%, 16%, and 49%; with an average of 40%. Finally,

Tsoi (1993) did not report how many persons had undergone SRS. The attrition rate makes it very difficult to evaluate the effects of SRS with accuracy. We hypothesize that the results for this group are significantly worse than for the available follow-up group. This high dropout rate significantly challenges the external validity or generalizability of our follow-up studies. We do not know what the prevalence rate is of false negatives, and/or what the fate is of these patients. We also do not know how many of them are rejected at first and then accepted later at the same or another treatment center.

It is also important to note that the effects of SR were not always evaluated at the same point in the treatment process. In some studies, the results were measured after the complete SR had been performed (including genital reconstructive surgery), but in other studies results were measured when not all patients had undergone genital reconstructive surgery (e.g., Bodlund & Kullgren, 1996; Smith et al., 2005a). These differences make comparisons between studies very difficult and a determination of the effectiveness of SR not easy, to say the least.

Although most follow-up studies come from North America, Western Europe, and Scandinavia, it is a welcome trend that treatment centers in other countries have started to report their results (e.g., Lobato et al., 2007; Tsoi, 1993; Tsoi et al., 1995). Nevertheless, some important treatment centers, for example in Thailand, still have not published outcome evaluations.

Different measurement instruments, some with unknown validity, have been used. Like Green and Fleming (1990) nearly 20 years ago, we would welcome more standardization.

#### *Effects of SRS: Postoperative Regret Among Adults*

How many patients regret that they have undergone SRS? Before discussing regret, however, one should first agree upon which statements, behaviors, and circumstances are an indication of regret. Pfäfflin (1992) has made a distinction between “minor” and “major” regret. Minor regret implies the difficulties or stumbling blocks that are experienced during or after the process of transformation, but which do not challenge the original wish for, and the subsequent effect of, SRS. Examples are pain, scars, and infections after an operation, the loss of a spouse or partners, the loss of a job, and conflicts with the family or friends. Although they are important for the individuals involved, we would not consider these relevant in evaluating the psychosocial outcomes of SRS on gender dysphoria. One could even argue that the given examples are not regret at all, but more unfortunate consequences or complications of treatment. Of course, they can contribute to the devel-



opment of regret, but many people who have such complications still do not regret the SRS (e.g., Eldh et al., 1997; Jarrar et al., 1996). Congruent with this line of reasoning, Lawrence (2006b) found, in a group of 232 MFs who underwent penile-inversion vaginoplasty and sensate clitoroplasty, that no *single* complication was associated with regretting SRS. Nevertheless, the presence of multiple complications is significantly associated with an increased likelihood of regret (Lawrence, 2003). “Major” regret was defined by Pfäfflin as “gender dysphoria in the new gender role and after SRS which is expressed in behavior” (Pfäfflin, 1992, p. 70). Some examples of such behaviors are attempts at re-orientation of gender role behavior, re-adoption of the former gender role, applications for legal name change, and attempts to have SRS reversed. Kuiper and Cohen-Kettenis (1998) have used a slightly different conceptualization of regret. They make a distinction between two dimensions: role reversal and expression of regret. This scheme results in four possible types of manifestations of regret (see Table 2). To our knowledge, such fine grade differentiations between forms of regret have never been made in follow-up studies of the effects of SRS. Neither are we aware of studies that have tracked the processes by which regret is developed. The primary instrument to measure regret—and more generally the outcome of SR(S)—is the self-report of the patient (Kuiper & Cohen-Kettenis, 1988; Lawrence, 2003, 2006b).

As already mentioned, Pfäfflin (1992), in his early review that included approximately 2,500 patients, reported the prevalence of regret to be very low: Only 1% to 2% of all patients (1% of FMs and 1.5%-2% MFs) had major regrets regarding their SRS. In other words, they regretted the SRS as such and experienced gender dysphoria in the new gender role. The outcome studies we reviewed confirmed the very low prevalence of regret after SRS (see Table 1) and corroborates Green and Fleming’s conclusion that “sex reassignment has demonstrated its clinical utility for many patients” (1990, p. 173). Illustrative of this very low prevalence rate is the large clinical series of Lawrence (2003; see also Lawrence, 2006b) and Smith et al. (2005a), and the Brazilian study of Lobato and colleagues (2006). Lawrence (2003) reported that no participants in her study of 232 MF transsexuals reported consistent regret. Only 6% of the patients (15 patients) were sometimes regretful and 1% (2 patients) reported part-time reversion to living as a man after SRS. In a follow-up study of 162 adult transsexuals (Smith et al., 2005a), the vast majority (98.4%) expressed no regrets about SRS. One MF had experienced such strong regrets during and after treatment that she would not choose SRS again, given a second opportunity. In contrast, a second MF, who had